

CLAIMS:

1. A light emitting diode (LED) light engine comprising:
 - a flexible electrical cable including first, second and third electrical conductors and an electrically insulating covering material for the electrical conductors, the conductors arranged substantially parallel with one another and having the insulating covering material therebetween;
 - a plurality of LEDs including
 - a first LED having a first lead electrically connected to the first electrical conductor and a second lead electrically connected to the second conductor,
 - a second LED having a first lead electrically connected to the second electrical conductor and a second lead electrically connected to the third conductor, and
 - a third LED having first and second leads electrically connected to the second conductor, wherein the third LED is interposed between the first LED and the second LED;
 - a plurality of prongs wherein each prong is in electrical communication with a respective lead of one of the LEDs, wherein each prong includes a tip adapted to pierce the insulating material of the flexible electrical cable and a gap for receiving one of the conductors; and
 - power conditioning electronics electrically connected to the first and third conductors, wherein the power conditioning electronics are adapted to convert AC power to DC power.
2. The light engine of claim 1, further comprising a plurality of socket housings mechanically affixed to the flexible cable, wherein each socket housing receives at least one of the LEDs.
3. The light engine of claim 2, wherein each socket housing receives at least one of the prongs.

4. The light engine of claim 2, further comprising a mounting portion for allowing the light engine to mount to an associated structure, wherein the mounting portion is attached to the socket housing.

5. The light engine of claim 2, wherein at least one of the socket housings includes a first section that selectively fastens to a second section, wherein the flexible cable is sandwiched between the first section and the second section such that a plane that intersects each of the electrical conductors is substantially perpendicular to a plane in which the LED that is received in the at least one socket resides.

6. The light engine of claim 2, wherein at least one of the socket housings includes a member adapted to puncture the electrically insulating covering material and electrically separates the second electrical conductor when the first section is fastened to the second section, whereby preventing electricity from flowing through the second electrical conductor.

7. The light engine of claim 1, further comprising an insulation barrier that separates the second electrical conductor to prevent an electrical connection between the first and second leads through the second electrical conductor.

8. The light engine of claim 1, further comprising a wire disposed in the flexible electrical cable for delivering information through the cable.

9. The light engine of claim 8, wherein the wire provides communication between a controller and at least one of the LEDs.

10. The light engine of claim 9, further comprising a plurality of wires disposed in the electrical cable, wherein each wire is in communication with a controller and at least one of the LEDs.

11. A channel letter including the light engine of claim 1.

12. The light engine of claim 1, further comprising a further plurality of LEDs each including electrical leads connected to the second wire, wherein the further plurality of LEDs are interposed between the first LED and the second LED.

13. A method of manufacturing a light engine, the method comprising:
insulating first, second and third conductive elements to form an insulated conductor, wherein the insulated conductor includes insulating material interposed between the conductive elements;

mechanically securing a plurality of light sources spaced along the insulated conductor;

electrically contacting a first lead of a first light source of the plurality of light sources to the first conductive element and a second lead of the first light source to the second conductive element;

electrically contacting a first lead and a second lead of a second light source of the plurality of light sources to the second conductive element;

electrically separating the second conductive element between the first lead and the second lead of the second light source by inserting a non-conductive member into the insulated conductor through the second conductive element; and

electrically contacting a first lead of a third light source of the plurality of light sources to the second conductive element and a second lead of the third light source to the third conductive element, wherein the second light source is interposed between the first light source and the third light source.

14. The method of claim 13, wherein each of the electrically contacting steps includes mechanically engaging the first lead of each light source to a prong and inserting a portion of the prong into the insulated conductor to receive one of the conductive elements.

15. The method of claim 13, wherein the mechanically securing step includes securing the light source such that a plane in which the light source resides is substantially perpendicular to a plane that intersects the first, second and third conductors.

16. A light string comprising:

a flexible electrical cable including a pair of parallel conductors, a continuous series conductor and an electrically insulating material covering for the electrical conductors, the conductors having the insulating material therebetween;

a first plurality LEDs mechanically affixed to the cable and electrically connected to one another in parallel; and

a second plurality of LEDs mechanically affixed to the cable and interposed between two adjacent LEDs of the first plurality of LEDs, wherein the second plurality of LEDs are electrically connected to one another in series.

17. The light string of claim 16, further comprising conditioning electronics in electrical communication with the plurality of LEDs, wherein the conditioning electronics convert AC power to DC power for driving the LEDs.

18. The light string of claim 16, wherein the series conductor is interrupted by an insulated barrier at a plurality of locations along the series conductor.

19. The light string of claim 18, wherein the insulated barrier comprises a dielectric material adapted to cut through the series conductor.

20. The light string of claim 16, further comprising an additional wire disposed in the flexible electrical cable, wherein the additional wire is in communication with at least one of the LEDs.